CHANGE
NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 1 April 2001

OPERATOR'S MANUAL

OPERATOR CONTROLS, PMCS,
OPERATION UNDER
USUAL CONDITIONS,
UNUSUAL CONDITIONS,
TROUBLESHOOTING, AND
MAINTENANCE

BRIDGE LAUNCHING CARRIER
M104 WOLVERINE
(5420-01-430-5403)

TM 5-5420-232-10, dated 01 March 2001, is changed as follows:

1. Remove old pages and insert new pages as indicated below.

2. New or changed information is indicated by a vertical bar in the margin of the page.

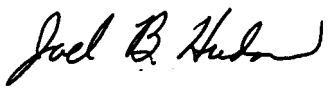
Remove Pages	Insert Pages
A and blank	A and blank
2-209 and 2-210	2-209 and 2-210
2-329 and 2-330	2-329 and 2-330
G-1 and G-2	G-1 and G-2
None	G-13 and G-14

File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

Official:



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Administrative Assistant to the
Secretary of the Army
0103702

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LIST OF EFFECTIVE PAGES

Dates of issue for original and changed pages are:

Original	1 March 01
Change 1	1 April 01

TOTAL NUMBER OF PAGES IS 1032, CONSISTING OF THE FOLLOWING:

Page/WP No.	*Change No.
Cover	0
a thru k	0
A	1
blank	0
i thru viii	0
1-1 thru 1-95	0
blank	0
2-1 thru 2-209	0
2-210	1
2-211 thru 2-329	0
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C-1 thru C-6	0
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F-1 thru F-14	0
G-1	0
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G-13 thru G-14	1
Index-1 thru Index-30	0

* Zero in this column indicates an original page or work package

LAUNCH BRIDGE (POWER UP LAUNCHER HYDRAULICS) - Continued

L. If LPU fails to start within 90 seconds:

1. Wait 30 seconds, then attempt to start LPU again. Repeat up to 5 times.
2. If LPU engine starts, proceed to step N.
3. If LPU does not start after 5 attempts, do troubleshooting (see 3-1).

M. After LPU engine starts, allow LPU to warm up at idle speed for 2 minutes.

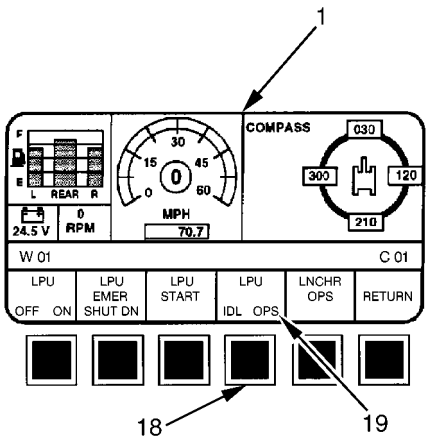
NOTE

If main engine is in AUTO COOLDOWN IN PROGRESS cycle when LPU is started, launch and retrieval operations with the LPU are disabled. Restart main engine, set pump select to LPU, and then shut down main engine.

N. Press LPU IDL/OPS pushbutton (18) until OPS (19) is highlighted. Proceed with normal operations.

O. Continuously monitor DID (1) during operations for fault messages. If any fault messages appear, do troubleshooting (see 3-1).

P. When LPU is no longer needed, shut down LPU (see 2-219).



LAUNCH BRIDGE (POWER UP LAUNCHER HYDRAULICS) - Continued

NOTE

- **Perform the following steps only when LPU is not operational, but bridge must be launched or retrieved. Upon completion of mission, notify unit maintenance.**
- **Time to launch/retrieve bridge using back-up hydraulic pump may be longer than when using LPU.**

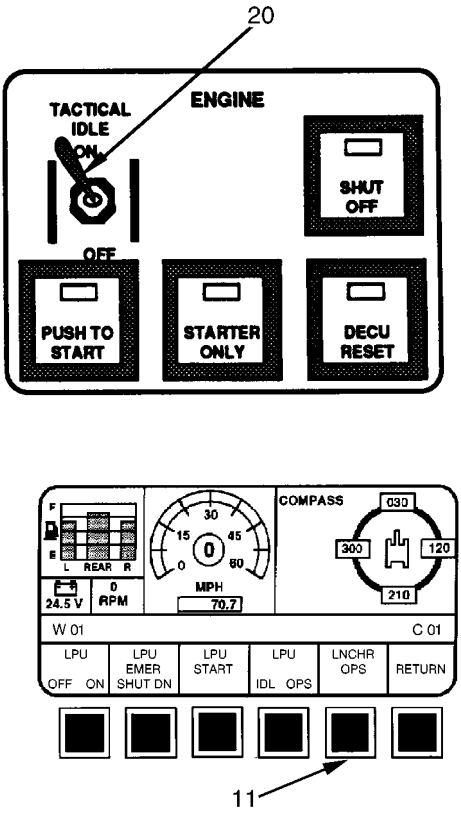
Q. To set up vehicle for operation using backup hydraulic pump, do the following:

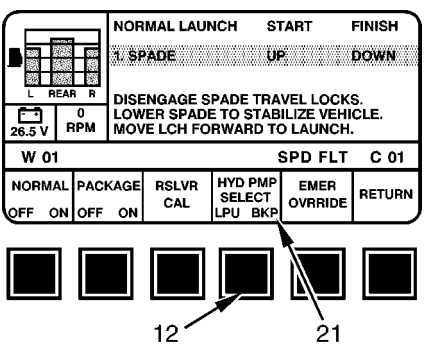
1. If vehicle engine is not running, start vehicle engine (see 2-155).
2. Set TACTICAL IDLE switch (20) to ON.
3. Press LNCHR OPS pushbutton (11).

NOTE

If changing pump selection from LPU to BKUP, ensure LPU speed is set to IDL before changing pumps.

4. Press HYD PUMP SELECT LPU/BKP pushbutton (12) until BKP (21) is highlighted, and continue with normal operations.





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LAUNCH BRIDGE (POWER UP LAUNCHER HYDRAULICS) - Continued

L. Press LNCHR OPS pushbutton (14) and make sure that LPU (15) on PUMP SELECT LPU/BKP pushbutton (16) is highlighted.

M. Press RETURN pushbutton (7).

N. After LPU engine starts, allow LPU to warm up at idle speed for 2 minutes.

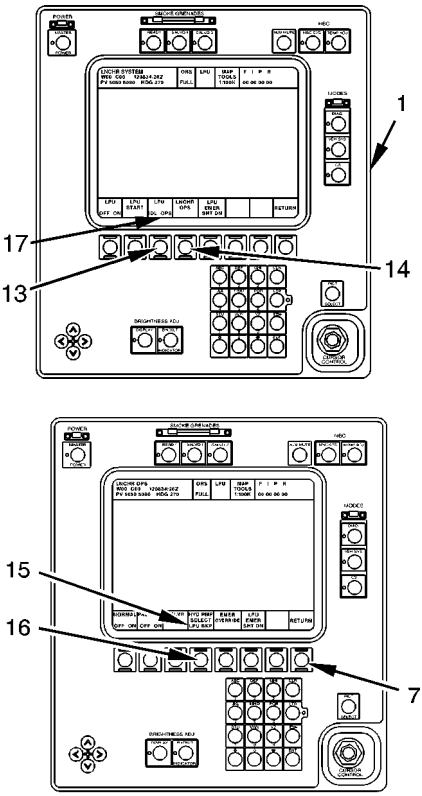
NOTE

If main engine is in AUTO COOLDOWN IN PROGRESS cycle when LPU is started, launch and retrieval operations with the LPU are disabled. Restart main engine, set pump select to LPU, and then shut-down main engine.

O. Press LPU IDL/OPS pushbutton (13) until OPS (17) is highlighted. Proceed with normal operations.

P. Continuously monitor CCP (1) during operations for fault messages. If any fault messages appear, do troubleshooting (see 3-1).

Q. When LPU is no longer needed, shut down LPU (see 2-219).



LAUNCH BRIDGE (POWER UP LAUNCHER HYDRAULICS) - Continued

NOTE

- **Perform the following steps only when LPU is not operational, but bridge must be launched or retrieved. Upon completion of mission, notify unit maintenance.**
- **Time to launch/retrieve bridge using back-up hydraulic pump may be slower than when using LPU.**

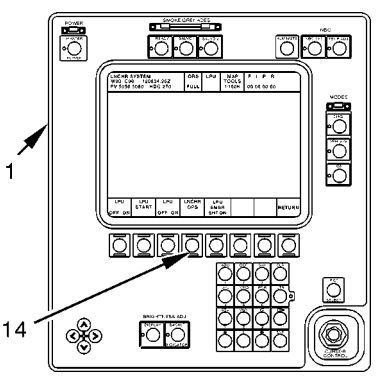
R. To set up vehicle for operation using backup hydraulic pump, do the following:

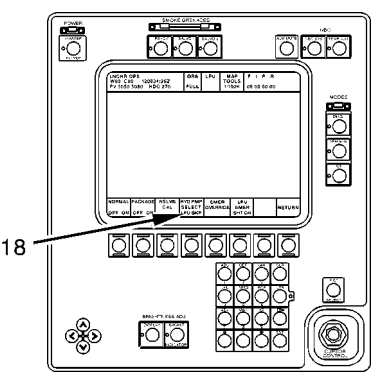
1. Ensure LPU is shut down (see 2-335).
2. If vehicle engine is not running, have driver start vehicle engine.
3. Have driver set TACTICAL IDLE switch to ON (see 2-207).
4. Press LNCHR OPS pushbutton (14) on CCP (1).

NOTE

BKP (18) in PUMP SELECT LPU/BKP is automatically highlighted when LPU is not running.

5. Ensure BKP (18) in PUMP SELECT LPU/BKP is highlighted before continuing with normal operations.





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APPENDIX G
LUBRICATION INSTRUCTIONS

G-1. SCOPE

This appendix provides crew lubrication instructions. Lubrication intervals (on-condition or hard time) are based on normal operation. Lubricate more often during constant use or in severe conditions.

G-2. GENERAL

All lubrication instructions are mandatory.

Use only authorized lubricants.

Interval symbols used are as follows: B - Before Operation, A - After Operation, AR - As Required, and M - Monthly.

For equipment under manufacturer's warranty, hard time service intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or equipment is operated under adverse conditions.

Engine, transmission, and hydraulic system fluid levels are checked according to this appendix, but drain and refill are subject to Army Oil Analysis Program (AOAP). Oil samples must be submitted by unit maintenance as follows: engine oil after 25 hours of engine operation or 60 days; transmission oil after 75 hours of engine operation or 90 days; hydraulic system oil annually. If AOAP is not available, hard time intervals apply.

Hard (fixed) time intervals and the related man-hour times are based on normal operation. The man-hours time specified is the time you need to do all the services prescribed for a particular interval. Change the interval if your lubricants are contaminated or if you are operating the equipment under adverse conditions, including longer-than-usual operating hours. The interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken.

If operating in 0°F to -65°F (-18°C to -54°C) temperatures without Army Oil Analysis, semiannual/750 mile transmission and engine oil changes are required.

When checking fluid levels, vehicle must be on level surface.

Dispose of used lubricants in accordance with local Standing Operating Procedures (SOP).

For arctic operation, see FM 9-207.

For desert operation, see FM 90-3.

If no other treatment is directed, paint or coat unprotected metal surfaces with oil (PL-S) or (PL-M) (Item 30 or Item 29, Appendix D).

Clean around filler necks/drain plugs/openings before servicing to keep dirt from entering system.

LUBRICATION INSTRUCTIONS

WARNING

Dry cleaning solvent is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I Dry Cleaning Solvent is 100°F (38°C), and for Type II is 140°F (60°C). If you become dizzy while using dry cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

Use clean rag (Item 33, Appendix D) and dry cleaning solvent (Item 35, Appendix D) to clean grease or oil from all metal surfaces except those exposed to powder fouling. For powder-fouled surfaces, use CLP (Item 7, Appendix D).

Lubricate oil can points as required. Use PL-M (Item 29, Appendix D) to lubricate the following items:

Number one left and right skirts locking arm shoulder bolts

Fuel caps and retaining pins.

Steering control rod, control cable clevises, and bellcranks.

Steer arm pin and clevises.

Shift selector assembly.

Service brake bellcranks, cable clevises, and brake pedal hinge points.

Parking brake pedal mechanism, cable clevises, and pulleys.

Parking brake lock/release mechanism.

Drain valve/control rod, cable, and handle clevises.

Fire extinguisher release mechanism pivot points and bearing surfaces.

Bridge drive timing chain.

Commander's hatch latch.

Bridge threaded yokes.

Bridge tension springs.

OIL CAN POINTS

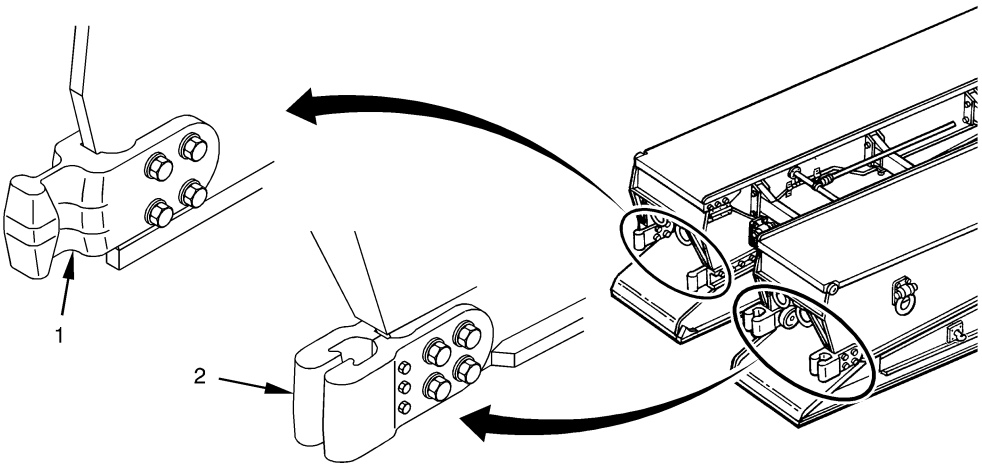
Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
All temperatures *	PL-M (O-192) MIL-L-3150	NA	S/AR	0.4

*For arctic operation, see FM 9-207

G-14. BRIDGE COUPLINGS LUBRICATION.

LUBRICANT ●	INTERVAL
MOBILGREAS28	A

BRIDGE COUPLINGS (1) AND (2)
See note.



BRIDGE COUPLINGS LUBRICANT

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
ALL	MOBILGREAS28	N/A	A	0.2

G-15. BRIDGE COUPLINGS LUBRICATION NOTE.

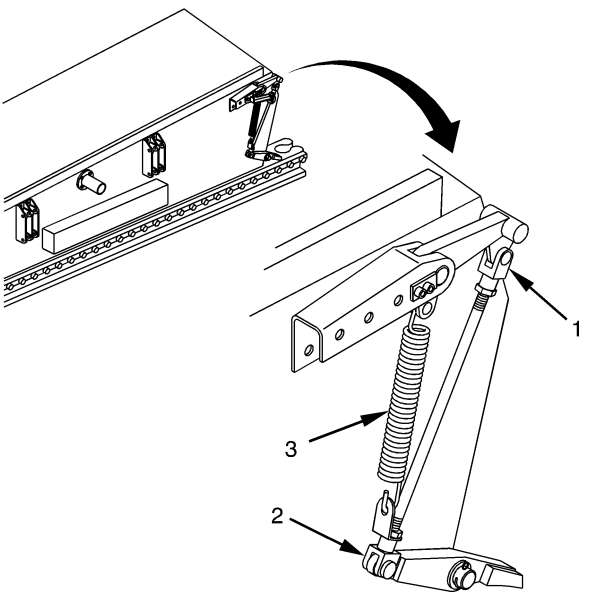
Apply light coat of grease to bridge couplings (1) and (2). Grease couplings (1) and (2) at both ends of bridge.

G-16. BRIDGE THREADED YOKES AND TENSION SPRING LUBRICATION.

LUBRICANT • INTERVAL

PL-M A

THREADED YOKES (1) AND (2)
See note 1.
TENSION SPRING (3)
See note 2.



BRIDGE THREADED YOKES AND TENSION SPRING LUBRICANT

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
ALL	PL-M (0-192) MIL-L-3150	N/A	A	0.2

G-17. BRIDGE THREADED YOKES AND TENSION SPRING NOTES.

1. Apply light coat of oil to threaded yokes (1) and (2). Lubricate threaded yokes (1) and (2) on both bridge halves.

2. Apply light coat of oil to entire length of tension springs (3). Lubricate springs (3) on both bridge halves.

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